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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/660,354

09/10/2003

Stephen F. Yates

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08/08/2007

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EXAMINER

CONLEY, SEAN EVERETT

ART UNIT

PAPER NUMBER

1744

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/660,354	<b>Applicant(s)</b> YATES ET AL.	
	<b>Examiner</b> Sean E. Conley	<b>Art Unit</b> 1744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 May 2007.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-44 and 64-66 is/are pending in the application.  
     4a) Of the above claim(s) 20-25, 33-44 and 66 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19, 26-32, 64 and 65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/10/2003</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of species I, claims 1-19, 26-32 and 64-65 (elected claim 66 depends from withdrawn claim 33 and therefore claim 66 is also withdrawn) in the reply filed on May 17, 2007 is acknowledged. The traversal is on the ground(s) that the species, as delineated by the Examiner, are related under the instant disclosure. The Applicant states that, for example, the units of figures 2A and 2B may both be used in the aircraft embodiment of figure 3 and cites MPEP Section 806.04(b).

The Examiner disagrees because the aircraft embodiment of figure 3 already discloses a materially different air quality system (120). Additionally, the species are not related under a claimed genus and the air quality system of figures 2A and 2B, systems (20') and (20''), are each materially different from each other as well as different from the system (120) of figure 3. Furthermore, the applicant has clearly indicated in the specification that the figures 2A, 2B and 3 all refer to different embodiments of the invention (see paragraphs [0040], [0042], and [0044]. Claims 20-25, 33-44 and 66 are withdrawn from consideration for being directed to a non-elected species.

The requirement is still deemed proper and is therefore made FINAL.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 17, 28 and 64 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites the limitations "said at least one photocatalytic oxidation unit" and "said at least one adsorbent unit". There is insufficient antecedent basis for these limitations in the claim.

Claim 28 recites the limitation "said second photocatalytic oxidation unit". There is insufficient antecedent basis for this limitation in the claim.

Claim 64 recites the limitation "said metal support". There is insufficient antecedent basis for this limitation in the claim.

4. Claim 32 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, claim 32 recites "ECS" which is considered indefinite because one of ordinary skill in the art cannot ascertain what is included or excluded from the claim language. The acronym "ECS" can mean a number of different things. The examiner suggests replacing "ECS" with "environmental control system" as recited in the specification.

***Claim Rejections - 35 USC § 102***

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5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-6, 8, 13, 15-19 and 64 are rejected under 35 U.S.C. 102(b) as being anticipated by Say et al. (U.S. Patent No. 6,063,343).

Regarding claims 1 and 15, Say et al. disclose the air treatment unit of claim 26 for removing a pollutant from an air stream and which is further capable of providing cleansed air to an interior air space. The system comprising at least one air cleaner unit (reactor (100)) in communication with said interior air space, wherein said at least one air cleaner unit provides only a single flow path for said air stream using blower (118). Blower (118) is used to facilitate unidirectional air flow in the direction of the arrows in figure 5. The at least one air cleaner unit comprises a first photocatalytic oxidation unit (formed by photocatalytic fins (102)) and a first adsorbent unit (adsorbent buffer (not shown) positioned in the fluid stream before fins (102) with lamps (104) – see col. 7, lines 32-55), and furthermore said first photocatalytic oxidation unit is located downstream from said first adsorbent unit (see figure 5; see col. 3, lines 38-65; see col. 7, lines 12-55).

Regarding claims 2 and 3, Say et al. disclose that the first photocatalytic unit (formed by photocatalytic fins (102) with lamps (104)) is physically separated from and

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located downstream from the first adsorbent unit (not shown but disclosed as being positioned upstream before fins (102) – see col. 7, lines 32-55).

Regarding claim 4, Say et al. disclose that the first absorbent unit is adapted to reversibly adsorb said pollutant from said air stream at a first concentration of said pollutant, and said first adsorbent unit is further adapted to desorbs said pollutant into said air stream at a second concentration of said pollutant (see col. 7, lines 32-55).

Regarding claims 5 and 6, Say et al. disclose that the air cleaner unit comprises a second adsorbent unit (post-filter (122)) comprising an adsorbent bed, said first photocatalytic oxidation unit (formed by photocatalytic fins (102) with lamps (104)) is located downstream from said first adsorbent unit, and said second adsorbent unit (122) is located downstream from said first photocatalytic oxidation unit (see figure 5; see col. 7, lines 25-31). Say et al. further disclose that said first adsorbent unit is adapted to reversibly adsorb said pollutant from said air stream at a first concentration of said pollutant, said first adsorbent unit is further adapted to desorb said pollutant into said air stream at a second concentration of said pollutant, and said second adsorbent (122) unit is capable of irreversibly adsorbing said pollutant from said air stream (see col. 7, lines 25-55).

Regarding claim 8, Say et al. disclose that the air cleaner unit (reactor (100)) is formed is a modular subassembly and adapted to connect to other sub assemblies to form a larger reactor. The use of subassemblies may be interconnected in series or parallel (see col. 8, lines 12-20). Thus, the air cleaner unit has a second photocatalytic

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oxidation unit (formed by fins (102) and lamps (104)) and is located downstream from the second adsorbent unit (post-filter (122)).

Regarding claim 13, the air cleaner unit (reactor (100)) is capable of being used in combination with the interior air space within an aircraft.

Regarding claim 16, Say et al. disclose an air cleaner unit (100) that is capable of continuously providing a stream of cleansed air to a location downstream of the air cleaner unit (see figure 5; see col. 7, lines 12-18).

Regarding claim 17, Say et al. disclose a particulate filter (pre-filter (120)) located upstream from the photocatalytic oxidation unit (formed by fins (102) and lamp (104)) and the adsorbent filter (122) (see figure 5; see col. 7, lines 12-25).

Regarding claims 18 and 19, the air cleaner unit of Say et al. is capable of operating at a constant temperature and at ambient temperature. Say et al. does not disclose any requirements on a specific operating temperature.

Regarding claim 64, Say et al. disclose that the first photocatalytic oxidation unit comprises at least one photocatalytic panel (fin (102)) and an ultraviolet source (104), wherein the fin (102) comprises a metal photocatalytic support and a photocatalyst (see col. 3, lines 50-65; see col. 6, lines 25-28).

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
8. Claims 7 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Say et al. as applied to claims 1 and 6 above, and further in view of the Applicant's Admission.

Say et al. fails to specifically disclose the isotherm curves of the adsorbent materials of the first and second adsorbent and also fails to specifically disclose the size of the micropores of the adsorbent material or an adsorbent material that is activated carbon fabric.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Say et al. and use any suitable material having a specific isotherm curve, specific pore size, or a specific material type for the first and second adsorbent unit since the Applicant has admitted that selecting the appropriate adsorbent material for an adsorbent unit is a matter of design choice (see specification page 21, lines 12-30).



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9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Say et al. as applied to claim 8 above, and further in view of Ogata et al. (U.S. Patent No. 6,531,100 B1).

Say et al. disclose that the photocatalytic oxidation unit comprises at least one photocatalytic panel (fin (102)), wherein the fin (102) comprises a metal photocatalytic support (see col. 3, lines 50-65). However, Say et al. is silent with regards to specific types of metal used for the photocatalytic support, therefore, it would have been necessary and thus obvious to look to the prior art for conventional metal materials. Ogata et al. provides this conventional teaching showing that it is known in the art to use aluminum substrate as the support material for a photocatalyst (see col. 2, lines 52-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the metal photocatalytic support from aluminum motivated by the expectation of successfully practicing the invention of Say et al.

10. Claims 1, 14 and 26-28 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mirowsky et al. (U.S. Patent Application Publication US 2003/0150222 A1) in view of Say et al.

Mirowsky et al. disclose an air treatment system for airplanes to eliminate or substantially reduce airborne contaminant and odor problems. The system comprises: an environmental conditioning system "ECS" (213) for heating, cooling, and compressing the air and an air circulation system with ductwork in communication with the interior air space of the cabin. The environmental conditioning system (213) also

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functions as a mix manifold in that it combines the air from the intake unit with the air from the cabin (see figure 1). The cabin (203) has a vent (207) connected to ingress ductwork (205), which removes air from the cabin via blowers (21) into the environmental conditioning system (213). After the intake air is conditioned at component (213) it passes through egress ductwork (243) and vent (209) in the cabin ceiling (211). The egress ductwork (243) further includes a plurality of ionic oxygen generators (319, 321, 323, 325) which destroy contaminants in the air (see figure 1; see paragraphs [0034]-[0037]). The ionic oxygen generators are located downstream from the environmental conditioning system (213) and between an air intake unit (location where the outside air comes in at filter (37)) and the cabin (see figure 1). Furthermore, it is well known that the flight deck is the upper most part of the cabin in airplanes and thus the air space of the cabin also represents the air space of the flight deck. Mirokowsky et al. fails to disclose an air quality system containing an air cleaning unit as recited in Applicant's claim 26.

Say et al. disclose an air treatment unit for removing a pollutant from an air stream and which is further capable of providing cleansed air to an interior air space. The system comprising at least one air cleaner unit (reactor (100)) in communication with said interior air space, wherein said at least one air cleaner unit provides only a single flow path for said air stream using blower (118). Blower (118) is used to facilitate unidirectional air flow in the direction of the arrows in figure 5. The at least one air cleaner unit comprises a first photocatalytic oxidation unit (formed by photocatalytic fins (102)) and a first adsorbent unit (adsorbent buffer (not shown) positioned in the fluid

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stream before fins (102) with lamps (104) – see col. 7, lines 32-55), and furthermore said first photocatalytic oxidation unit is located downstream from said first adsorbent unit (see figure 5; see col. 3, lines 38-65; see col. 7, lines 12-55). Say et al. also disclose that the air cleaner unit comprises a second adsorbent unit (post-filter (122)) comprising an adsorbent bed, wherein said second adsorbent unit (122) is located downstream from said first photocatalytic oxidation unit (see figure 5; see col. 7, lines 25-31). Furthermore, Say et al. disclose that the air cleaner unit (reactor (100)) is formed is a modular subassembly and adapted to connect to other sub assemblies to form a larger reactor. The use of subassemblies may be interconnected in series or parallel (see col. 8, lines 12-20). Thus, the subassemblies form a battery of air cleaner units. Regarding claim 28, Say et al. disclose that each photocatalytic oxidation unit comprises at least one photocatalytic panel (fin (102)) and an ultraviolet source (104), wherein the fin (102) comprises a metal photocatalytic support and a photocatalyst (see col. 3, lines 50-65; see col. 6, lines 25-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the airplane air treatment system of Mirowsky et al. and substitute the ionic oxygen generators with the functionally equivalent air treatment unit of Say et al. since the substitution of known equivalent structures involves only ordinary skill in the art. Furthermore, the courts have held that when a patent teaches a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result. *KSR v. Teleflex*

11. Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over Say et al. as applied to claim 1 above.

Say et al. discloses the claimed invention in the embodiment as shown in figure 5 and disclosed in col. 3, lines 38-65 and col. 7, lines 12-55. However, this embodiment of Say et al. fails to disclose the configuration of lamps and photocatalytic panels as recited in claim 65. However, an alternative embodiment of Say et al., shown in figure 9, discloses a photocatalytic oxidation unit (formed by fins (502) and lamps (504) in reactor (500)) comprising a plurality of photocatalytic panels (fins (502)) and a plurality of ultraviolet sources (lamps (504)), wherein the panels and ultraviolet sources are arranged linearly and parallel to each other in an alternating setup (see figure 9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the photocatalytic oxidation unit of figure 5 with the photocatalytic oxidation unit of figure 9 based on the suitability and desired characteristics of the arrangement. Furthermore, substitution of known functionally equivalent structures involves only ordinary skill in the art and the courts have held that when a patent teaches a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result. *KSR v. Teleflex*

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12. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mirowsky et al. in view of Say et al. as applied to claim 26 above, and further in view of the Applicant's Admission.

Mirowsky et al. in view of Say et al. fail to specifically disclose the size of the micropores of the adsorbent material. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Mirowsky et al. in view of Say et al. and use any suitable material having a specific isotherm curve, specific pore size, or a specific material type for the first and second adsorbent unit since the Applicant has admitted that selecting the appropriate adsorbent material for an adsorbent unit is a matter of design choice (see specification page 21, lines 12-30).

### ***Conclusion***

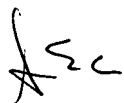
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean E. Conley whose telephone number is 571-272-8414. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gladys Corcoran can be reached on 571-272-1214. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to be 'JSC' or similar, written over the word 'Sec'.

August 1, 2007

  
ELIZABETH MCKANE  
PRIMARY EXAMINER